

REMARKS

INTRODUCTION

In accordance with the foregoing, claim 1 has been amended. Claims 1-16 are pending in the application.

CLAIM OBJECTIONS

Claim 1 is objected to due to informalities. Appropriate correction has been made to claim 1. Withdrawal of the foregoing objection is requested.

CLAIM REJECTIONS – 35 U.S.C. § 103

Claims 1, 2, 5 and 6 were rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al. (U.S. 5,689,290) (hereinafter "Saito") in view of Chuang et al. (U.S. 5,708,957) (hereinafter "Chuang").

Saito discusses a liquid level detecting mechanism and ink jet recording apparatus having the mechanism. In Saito, light rays emitted from light emitting diode 34 will pass across the ink chamber to reach the phototransistor 35. When the ink level 27 (ink level 26) is above the transparent windows 30, 31, the light ray C will pass through the ink, resulting in a smaller quantity of light reaching the phototransistor 35. If the ink level 26 is lower as the recording head 2 consumes the ink 25, the ink level 27 within the ink chamber 22 will also fall. And if the ink level 27 (ink level 26) is lower than the transparent window 30, 31, light ray C never passes through the ink, resulting in a greater amount of light reaching the phototransistor 35. An output signal from the phototransistor 35 is coupled to a comparator circuit, so that the ink level 27 on the portion of the transparent windows 30, 31 can be detected in the form of digital output. Saito, 5:32-5:48.

Chuang discusses an optical sensor that uses a radio luminescent light source to supply the incident radiation for detecting a selected substance in a test medium. Chuang, Abstract. Further, Chuang discusses an optical sensor that is provided with a self-powered light source by the use of a radio luminescent material that includes a radioactive beta emitter constituent and a phosphor constituent energized by beta particles from the radioactive constituent to emit light. By appropriate selection of the phosphor compound, the wavelength of light produced by the radio luminescent source may be matched to a corresponding sensing matrix to optimally configure

the sensor for the detection of a particular substance of interest. Chaung, 2:29-2:39.

Amended claim 1 recites: "...a supporting member disposed adjacent to an interior surface of the ink tank..." Support for this amendment may be found at least in Figure 2 of the application. In contrast to amended claim 1, Saito discusses a liquid level detecting mechanism where the light source is outside of the ink tank. Further, the liquid level detecting mechanism discussed in Saito is directed towards detecting the level of liquid in a tank communicating with the ink tank rather than in the ink tank itself. Chaung supplies neither of the foregoing deficiencies.

Claims 2, 5 and 6 depend on claim 1 and are therefore believed to be allowable for at least the foregoing reasons. Further, claims 2, 5 and 6 recite features that patentably distinguish over Saito and Chuang, taken alone or in combination. For example, claim 2 recites a transparent window disposed at a corresponding position of the supporting member to pass the light from the luminous member, where the photo detector detects the light passed through the transparent window.

Withdrawal of the foregoing rejection is requested.

CLAIM REJECTIONS – 35 U.S.C. § 103

Claims 3 and 4 were rejected under 35 U.S.C. 103(a) as being unpatentable over Saito in view of Chuang; and further in view of Kitagawa et al. (U.S. 6,264,855) (hereinafter "Kitagawa").

Kitagawa discusses a process for preparing water resistant luminous pigments including a pigment that is homogeneously dispersed in each kind of ink vehicle, paint vehicle or the like to give a luminous ink or a luminous paint. Kitagawa, 6:42-6:45.

Claims 3 and 4 depend on claim 1 and are therefore believed to be allowable for at least the foregoing reasons. Further, claims 3 and 4 recite features that patentably distinguish over Saito, Chuang and Kitagawa, taken alone or in combination. For example, claim 3 recites that the luminous member is a luminous paper.

Withdrawal of the foregoing rejection is requested.

CLAIM REJECTIONS – 35 U.S.C. § 103

Claims 7 and 10-13 were rejected under 35 U.S.C. 103(a) as being unpatentable over Saito in view of Chuang.

Claim 7 recites: "...an ink level detecting device detecting an amount of residual ink in the printer using the photo detector, and comprising a luminous member comprising a self-luminous material or a material with luminous paint to detect when a level of ink is lower than a predetermined level during a printing operation without a separate powered light source." In contrast to claim 7, Saito does not discuss a luminous member capable of emitting light without a powered light source. Chuang does not supply this deficiency in Saito. Although Chuang does discuss a self-powered light source, the light source in Chuang is directed towards a sensing system that operates to detect particular substances within a sample, not level detection. There is no motivation to combine the self-powered light source discussed in Chuang with the liquid level detecting mechanism discussed in Saito.

Claims 10-13 depend on claim 7 and are therefore believed to be allowable for at least the foregoing reasons. Further, claims 10-13 recite features that patentably distinguish over Saito and Chuang, taken alone or in combination. For example, claim 11 recites that when the ink tank is full, the ink level is over the transparent window and the light from the luminous member cannot pass through the transparent window, and the photo detector cannot detect any light.

Withdrawal of the foregoing rejection is requested.

CLAIM REJECTIONS – 35 U.S.C. § 103

Claims 8 and 9 were rejected under 35 U.S.C. 103(a) as being unpatentable over Saito in view of Chuang, and further in view of Denton et al. (U.S. 6,293,143) (hereinafter "Denton").

Denton discusses an ink level sensing device and method including a digital signal generated as a result of the output change that is relayed to the printer control to signal a low ink level alarm. Denton, 4:56-4:60.

Claims 8 and 9 depend on claim 7 and are therefore believed to be allowable for at least the foregoing reasons. Further, claims 8 and 9 recite features that patentably distinguish over Saito, Chuang and Denton, taken alone or in combination. For example, claim 8 recites a controller controlling operations of the inkjet printer and outputting a signal indicative that the

level of ink is lower than the predetermined level to an output device.

Withdrawal of the foregoing rejection is requested.

CLAIM REJECTIONS – 35 U.S.C. § 103

Claims 14 and 16 were rejected under 35 U.S.C. 103(a) as being unpatentable over Saito in view of Chuang.

Claim 14 recites: "...a luminous member comprising a self-luminous material to detect when a level of ink is lower than a predetermined level during a printing operation, wherein the luminous member is capable of emitting light without using a powered light source." In contrast to claim 14, Saito does not discuss a self-luminous material capable of emitting light without a powered light source. Chuang does not supply this deficiency in Saito. Although Chuang does discuss a self-powered light source, the light source in Chuang is directed towards a sensing system that operates to detect particular substances within a sample, not level detection. There is no motivation to combine the self-powered light source discussed in Chuang with the liquid level detecting mechanism discussed in Saito.

Claim 16 recites: "...a luminous member comprising a self-luminous material to detect a level of ink, wherein the luminous member is capable of emitting light without using a powered light source." In contrast to claim 16, Saito does not discuss a self-luminous material capable of emitting light without a powered light source. Chuang does not supply this deficiency in Saito. Although Chuang does discuss a self-powered light source, the light source in Chuang is directed towards a sensing system that operates to detect particular substances within a sample, not level detection. There is no motivation to combine the self-powered light source discussed in Chuang with the liquid level detecting mechanism discussed in Saito.

Withdrawal of the foregoing rejections is requested.

CLAIM REJECTIONS – 35 U.S.C. § 103

Claim 15 was rejected under 35 U.S.C. 103(a) as being unpatentable over Saito in view of Chuang, and further in view of Kitagawa.

Claim 15 depends on claim 14 and is therefore believed to be allowable for at least the foregoing reasons. Further, claim 15 recites features that patentably distinguish over Saito, Chuang and Kitagawa, taken alone or in combination. For example, claim 15 recites that the

luminous paper is disposed at a predetermined position of an ink tank to detect whether the ink is lower than the predetermined level using a light emitted therefrom.

Withdrawal of the foregoing rejection is requested.

CONCLUSION

If there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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